IN THE SUPERIOR COURT OF THE STATE OF CALIFORNIA
IN AND FOR THE COUNTY OF SAN FRANCISCO
HONORABLE CARLOS T. BEA, JUDGE PRESIDING
DEPARTMENT SIXTEEN
---OOO---

ROGER L. WRIGHT AND THAIS M. WRIGHT,

PLAINTIFFS,

V.

ABEX CORPORATION, ET. AL.,

DEFENDANTS.

NO. 966580

REPORTER'S PARTIAL TRANSCRIPT OF DAILY PROCEEDINGS
TESTIMONY OF BARRY R. HORN, M.D.
---OOO---
THURSDAY, AUGUST 3, 1995
---OOO---

A P P E A R A N C E S:

APPEARANCES - (CONTINUED):

FOR THE DEFENDANTS: (HOLLINGSWORTH & VOSE)
ANDREW J. MCELANEY, JR., ESQ.
STEPHEN J. BRAKE, ESQ.
NUTTER, MCCLENNEN & FISH
ONE INTERNATIONAL PLACE
BOSTON, MASSACHUSETTS 02110

ALSO PRESENT: (LOCAL COUNSEL FOR LORILLARD)
DONALD F. ZIMMER, JR., ESQ.
PREUSS, WALKER & SHANAGHER
595 MARKET STREET, SIXTEENTH FLOOR
SAN FRANCISCO, CALIFORNIA 94105

---OOO---

http://legacy.library.ucsf.edu/tid/gmn05a00/pdf
Digitized by the Tobacco Industry Documents Library at UCSF http://tobaccodocuments.ucsf.edu/docs/nfxd0001

I N D E X

FOR THE PLAINTIFFS:	DIRECT	CROSS	RE-DIRECT	RE-CROSS	VOIR DIRE
BARRY R. HORN, M.D.	5				

FOR THE DEFENDANTS:
NONE.

E X H I B I T S

	FOR I.D.	IN EVID.
FOR THE PLAINTIFFS:		
NONE.		
FOR THE DEFENDANTS:		
NONE.		

---O0O---

http://legacy.library.ucsf.edu/tid/gmo5a00/pdf Digitized by the Tobacco Industry Documents Library at UCSF http://www.industrydocuments.ucsf.edu/docs/nfxd0001

THURSDAY, AUGUST 3, 1995 8:39 A.M.

///// ///// ///// ///// /////

MR. HARLEY: DR. BARRY HORN.

TESTIMONY OF

BARRY R. HORN, M.D.,

CALLED AS A WITNESS ON BEHALF OF THE PLAINTIFFS, AND BEING DULY SWORN, TESTIFIED AS FOLLOWS:

THE CLERK: PLEASE STEP FORWARD AND RAISE YOUR RIGHT HAND.

DO YOU SOLEMNLY SWEAR THAT THE TESTIMONY YOU ARE ABOUT TO GIVE WILL BE THE TRUTH, THE WHOLE TRUTH, AND NOTHING BUT THE TRUTH, SO HELP YOU GOD?

THE WITNESS: I DO.

THE CLERK: COULD YOU STATE YOUR NAME FOR THE REPORTER AND SPELL IT?

THE WITNESS: BARRY R. HORN, H-O-R-N.

THE CLERK: THANK YOU, DR. HORN.

HAVE A SEAT, PLEASE.

///

DIRECT EXAMINATION

BY MR. HARLEY, COUNSEL ON BEHALF OF PLAINTIFFS:

Q. GOOD MORNING, DR. HORN.

A. GOOD MORNING.

Q. DR. HORN, YOU ARE A PHYSICIAN?

A. I AM.

Q. AND WHAT'S YOUR SPECIALTY?

A. I'M A PULMONARY SPECIALIST.

Q. AND WHERE DO YOU PRACTICE?

A. I PRACTICE ALTA BATES MEDICAL CENTER IN BERKELEY.

Q. DR. HORN, WOULD YOU BRIEFLY REVIEW YOUR EDUCATIONAL BACKGROUND?

A. I WENT TO UNDERGRADUATE SCHOOL AT CORNELL UNIVERSITY FROM 1960 TO 1964, WHERE I MAJORED IN CHEMISTRY.

FROM 1964 TO 1968, I WENT TO MEDICAL SCHOOL AT THE STATE UNIVERSITY OF NEW YORK, DOWNSTATE MEDICAL CENTER IN NEW YORK CITY, AND GRADUATED IN 1968.

FROM 1968 TO 1969, I WAS AN INTERN IN INTERNAL MEDICINE AT MICHAEL REESE HOSPITAL IN CHICAGO. INTERNAL MEDICINE IS THE STUDY OF ALL OF THE DISEASES OF THE BODY.

FROM 1969 TO 1971, I WAS A RESIDENT IN INTERNAL MEDICINE AT THE UNIVERSITY OF CHICAGO HOSPITALS AND MICHAEL REESE HOSPITAL.

FROM 1971 TO 1974, I DID MY TRAINING IN PULMONARY DISEASES AT STANFORD. I HAD WHAT IS CALLED A "FELLOWSHIP" IN PULMONARY DISEASES.

DURING THAT THREE-YEAR PERIOD, I WAS AN INSTRUCTOR IN THE DEPARTMENT OF PHYSIOLOGY IN THE MEDICAL SCHOOL, TEACHING MEDICAL STUDENTS HOW THE LUNG WORK.

Q. DR. HORN, JUST TO PAUSE, A "RESIDENT" IS A "DOCTOR," YOU ARE PRACTICING MEDICINE AT THAT POINT IN TIME?

A. YES. YES.

Q. OKAY.

A. DURING MY THIRD YEAR AT STANFORD, I WAS MEDICAL DIRECTOR OF THE RESPIRATORY THERAPY DEPARTMENT AT STANFORD HOSPITAL, WHICH IS ONE OF THE CLINICAL DEPARTMENTS IN THE HOSPITAL THAT DELIVERS CARE TO PEOPLE WHO ARE HOSPITALIZED

AT STANFORD.

DURING THAT THREE-YEAR PERIOD, I SPENT A CONSIDERABLE AMOUNT OF TIME SEEING PATIENTS, DOING BASIC

http://legacy.library.ucsf.edu/tid/gmo5a00/pdf Digitized by the Tobacco Industry Documents Library http://industrydocuments.ucsf.edu/docs/nfxd0001

RESEARCH AND DOING CLINICAL RESEARCH.
Q. AND TEACHING?
A. AND TEACHING.
Q. DR. HORN, AFTER COMPLETING YOUR RESIDENCY, YOU BEGAN YOUR CAREER; IS THAT CORRECT?
A. RIGHT.
Q. AND WOULD YOU TRACE YOUR CAREER FOR US?
A. FROM 1974 TO 1976, I WAS IN THE UNITED STATES AIR FORCE. I WAS STATIONED AT THE AIR FORCE'S WORLDWIDE CENTER FOR LUNG DISEASE, WHICH AT THAT TIME WAS IN BELLEVILLE, ILLINOIS, AT SCOTT AIR FORCE BASE. I WAS CHIEF OF THE NONTUBERCULOUS SECTION OF THE CHEST SERVICE.

WE WERE THE MAJOR REFERRAL SERVICE FOR THE ENTIRE AIR FORCE. THAT INCLUDED EVERYONE WHO WAS ON ACTIVE DUTY, ALL OF THEIR DEPENDENTS AND ALL OF THE RETIREES WHO GOT CARE AT OR AROUND AIR FORCE BASES THROUGHOUT THE WORLD. SO OUR REFERRAL POPULATION WAS FIVE MILLION PEOPLE.

WE HAD AN EXTREMELY LARGE SERVICE. WE HAD EIGHT BEDS OF A 250 BED HOSPITAL AND THOSE BEDS WERE FULL ALL THE TIME. EVERY DAY A PLANE LANDED FROM SOMEWHERE IN THE WORLD BRINGING US AT LEAST ONE PERSON FOR US TO EVALUATE AND TREAT BECAUSE THEY HAD COMPLICATED LUNG DISEASE.

Q. DR. HORN, AFTER LEAVING THE AIR FORCE, DID YOU BEGIN A PRIVATE PRACTICE?
A. YES. I THEN MOVED TO BERKELEY, WHERE I HAVE BEEN IN

THE PRIVATE PRACTICE OF PULMONARY DISEASES SINCE 1976. I HAVE A HOSPITAL BASED PRACTICE; MY OFFICE IS IN THE HOSPITAL. I'M IN PRACTICE WITH FOUR OTHER PULMONARY PHYSICIANS.

PATIENTS GET TO US UPON REFERRAL FROM OTHER PHYSICIANS IN OUR COMMUNITY. WE TAKE CARE OF FEW PATIENTS PRIMARILY, WE SEE PATIENTS IN CONSULTATION FOR OTHER PHYSICIANS, AND WE FUNCTION, ALSO, AS CRITICAL CARE PHYSICIANS.

Q. WHAT DOES THAT MEAN?
A. WE TAKE CARE OF PEOPLE WHO ARE REALLY SICK. SO WE ARE MEDICAL DIRECTORS OF THE INTENSIVE CARE UNIT OF THE INTENSIVE RESPIRATORY CARE UNIT. WE ARE MEDICAL DIRECTORS OF THE RESPIRATORY CARE UNIT, WE RUN A LONG-TERM VENTILATOR UNIT FOR PEOPLE WHO HAVE MAJOR INJURIES WHO ARE ON -- WHO HAVE TRACHEOSTOMIES AND NEED MECHANICAL VENTILATION FOR LONG PERIODS OF TIME AS WELL.
Q. SO YOUR GROUP SERVICES THE HOSPITAL NEEDS FOR THE CRITICALLY ILL PEOPLE AND THE PEOPLE THAT NEED BREATHING ASSISTANCE; IS THAT CORRECT?
A. RIGHT.
Q. MECHANICAL BREATHING ASSISTANCE?
A. RIGHT.
Q. WHAT'S THE NATURE OF YOUR PRIVATE PRACTICE, DO YOU ACTUALLY GET INVOLVED IN THE TREATMENT OF PEOPLE OR YOU JUST CONSULT WITH THE DOCTORS?
A. NO, WE MANAGE PEOPLE. SO WE WILL TAKE CARE. WE WILL TAKE OVER THE CARE OF INDIVIDUALS WHO ARE IN THE ICU.

THEY MAY NOT HAVE ORIGINALLY COME IN BECAUSE OF A PULMONARY PROBLEM; BUT BECAUSE THEY ARE SO SICK, THEIR WHOLE BODY SORT OF FALLS APART INCLUDING THEIR RESPIRATION AND THEY GO INTO ACUTE RESPIRATORY FAILURE AND WE WIND UP MANAGING THESE INDIVIDUALS, EITHER PORTIONS OF THEIR CARE OR ALL OF THEIR CARE.
Q. NOW, AS A DOCTOR, AT THIS POINT IN YOUR CAREER, ARE YOU PRETTY MUCH ABLE TO KEEP NORMAL HOURS, IS THAT STILL

http://legacy.library.ucsf.edu/tid/gmo5a00/pdf Digitized by the Legacy Industry Documents Library - http://industrydocuments.ucsf.edu/docs/nfxd0001

POSSIBLE IN YOUR SPECIALTY?
A. WELL, NOT AS A CRITICAL CARE SPECIALIST.
Q. WHY NOT?
A. WELL, PEOPLE ARE SICK 24 HOURS A DAY. SO I'M ON-CALL, THERE ARE FIVE OF US. SO DURING THE WEEK, I'M ESSENTIALLY ON-CALL EVERY FIFTH NIGHT, IN EFFECT. WE FREQUENTLY GO BACK TO THE HOSPITAL IN THE MIDDLE OF THE NIGHT.
I GET CALLED EVERY NIGHT. I MEAN, HARDLY A NIGHT EVER GOES BY WHEN I'M NOT CALLED IN THE MIDDLE OF THE NIGHT AT LEAST ONCE, USUALLY MUCH MORE THAN THAT. WE'RE ON-CALL TWO OUT OF FIVE WEEKENDS.
Q. AND THAT MEANS YOU ARE AT THE HOSPITAL PRETTY MUCH OF THAT WEEKEND?
A. WELL, WHEN I'M ON "FIRST CALL," I'M AT THE HOSPITAL BASICALLY ALL DAY, SATURDAY AND SUNDAY. WHEN I'M ON "SECOND CALL," WE MAKE ROUNDS ON PART OF THE PATIENTS. SO I'M AT THE HOSPITAL FOR ANYWHERE FROM THREE TO FIVE HOURS ON SATURDAY AND SUNDAY.
Q. NOW, DO SOME OF YOUR PATIENTS INCLUDE PEOPLE WITH

MALIGNANCIES OF THE CHEST?
A. YES.
Q. IS THAT A PROBLEM THAT YOU SEE WITH SOME REGULARITY?
A. YES.
Q. HAVE YOU TREATED PEOPLE WITH MESOTHELIOMA?
A. YES.
Q. HOW LONG HAVE YOU BEEN DOING THAT?
A. WELL, I GUESS, THE FIRST CASE I SAW WAS BACK IN MEDICAL SCHOOL IN THE 1960'S, AND CERTAINLY SINCE I HAVE BEEN IN PRACTICE I HAVE SEEN MANY INDIVIDUALS WITH MESOTHELIOMA WHO LIVE IN THE EAST BAY, WHO HAPPEN TO GET THEIR CARE ALTA BATES.
Q. AND YOU ARE INVOLVED WITH THE CARE OF THOSE PEOPLE?
A. YES.
Q. HAVE YOU DONE SO WITHIN THE LAST YEAR?
A. YES.
Q. DR. HORN, HAVE YOU ALSO BEEN INVOLVED WITH RESEARCH AND PUBLICATION IN THE FIELD OF ASBESTOS-RELATED DISEASE?
A. YES.
Q. ALL RIGHT.
AND INVOLVED IN STUDIES OF ASBESTOS-EXPOSED POPULATIONS?
A. YES.
Q. WOULD YOU EXPLAIN THAT JUST BRIEFLY TO THE JURY?
A. WELL, WITH REGARD TO THE PUBLICATION, TWO OF MY COLLEAGUES AND MYSELF STUDIED WORKERS FROM THE MARE ISLAND NAVAL SHIPYARD IN THE LATE 1970'S.
WE WERE INTERESTED IN HOW MANY OF THEM HAD

ASBESTOS-RELATED DISEASE AND HOW IT RELATED TO THE KIND OF WORK THEY DID IN THE SHIPYARD, THAT IS, DID IT MATTER WHETHER YOU HANDLED ASBESTOS-CONTAINING MATERIALS DIRECTLY YOURSELF OR IF YOU WERE IN THE ENVIRONMENT, IN THE SAME SPACES WHERE ASBESTOS-CONTAINING MATERIALS WERE BEING MANIPULATED.
THE QUESTION WAS, "DID IT MAKE ANY DIFFERENCE WITH REGARD TO YOUR RISK OF DEVELOPING ASBESTOS-RELATED DISEASE."
Q. AND YOUR CONCLUSION WAS?
A. IT DIDN'T MAKE ANY DIFFERENCE. IF YOU WORKED IN THE INTERIORS OF SHIPS IT DIDN'T MATTER WHETHER YOU WERE THE WORKER DIRECTLY IN HANDLING ASBESTOS-CONTAINING MATERIALS OR YOU WORKED IN THE SAME COMPARTMENTS WHERE YOUR RISK FOR

http://legacy.library.ucsf.edu/tid/gmo5a00/pdf Digitized by the Legacy Industry Documents Library - http://industrydocuments.ucsf.edu/docs/nfxd0001

DEVELOPING ASBESTOS-RELATED DISEASE WAS ROUGHLY THE SAME.
Q. AND, DR. HAMMAR (SIC) OR HORN -- I'M SORRY, DR. HORN -- YOU HAVE BEEN INVOLVED IN EXAMINING ASBESTOS EXPOSED POPULATIONS?
A. YES.
Q. HOW LONG HAVE YOU BEEN DOING THAT?
A. REALLY SINCE 1978 OR 1979 IN LARGE NUMBERS. I HAVE SEEN AN ENORMOUS NUMBER OF PEOPLE FOR THE UNITED STATES DEPARTMENT OF LABOR.
Q. HOW DID THAT COME ABOUT?
A. WELL, THE DEPARTMENT OF LABOR WAS AWARE THAT WE WERE DOING THE STUDY ON THE MARE ISLAND WORKERS. THESE ARE FEDERAL CIVILIAN WORKERS. THE DEPARTMENT OF LABOR WANTED INDIVIDUALS EVALUATED TO DETERMINE WHETHER THEY HAD ASBESTOS-RELATED DISEASE.

SO BEGINNING SOMEWHERE AROUND LATE 1978 OR EARLY 1979, ONE OF MY ASSOCIATES AND I BEGAN SEEING LARGE NUMBERS OF PEOPLE FOR THE DEPARTMENT OF LABOR IN ORDER TO DETERMINE WHETHER THE FEDERAL CIVILIAN WORKERS HAD WORK-RELATED ILLNESS, AND THE OVERWHELMING PREPONDERANCE OF PEOPLE WE HAVE SEEN FOR THE DEPARTMENT OF LABOR HAVE BEEN TO DETERMINE WHETHER THEY HAVE ASBESTOS-RELATED DISEASE. THERE ARE ALSO OTHER ISSUES, BUT THE OVERWHELMING PREPONDERANCE WAS FOR THIS PURPOSE.
Q. HOW MANY HAVE YOU SEEN OVER THOSE TEN, 15 YEARS?
A. I'LL STARTED COUNTING BETWEEN 1979 AND 1986. WHEN I STOPPED COUNTING, WE HAD SEEN WELL OVER 1,000 PEOPLE FOR THE DEPARTMENT OF LABOR.
Q. AND YOU CONTINUE TO SEE THEM TODAY?
A. YES.
Q. YOU HAVE ALSO BEEN INVOLVED AS A CONSULTANT IN ASBESTOS-RELATED LITIGATION?
A. YES.
Q. AND YOU HAVE TESTIFIED AS AN EXPERT IN COURT?
A. YES.
Q. HOW LONG HAVE YOU BEEN DOING THAT?
A. IT DEPENDS ON THE COURT SYSTEM. I WAS IN THIRD-PARTY COURT CASES SINCE JANUARY 19 '83, AND IN THE WORKERS' COMP SYSTEM PROBABLY BEFORE THAT.
Q. AND YOU HAVE TESTIFIED FOR ME AND MY FIRM ON OCCASION?
A. YES.
Q. AND FOR OTHER FIRMS?

A. YES.
Q. ON SOME OCCASIONS FOR DEFENDANTS?
A. YES.
Q. AND CONDUCTED EXAMINATIONS FOR THE GOVERNMENT?
A. YES.
Q. ALL INVOLVING VARIOUS FORMS OF ASBESTOS-RELATED DISEASE?
A. YES.
Q. WHAT IS YOUR CHARGE FOR REVIEWING RECORDS AND PREPARING OPINIONS AND REPORTS ON PERSONS WHO HAVE AN ASBESTOS-RELATED ILLNESS?
A. $300.00 AN HOUR.
Q. AND FOR APPEARING IN COURT?
A. $350.00 AN HOUR.
Q. DR. HORN, I'M GOING TO ASK YOU -- WE HAVE HAD SOME PRELIMINARY SORT OF DISCUSSIONS AND BEHIND YOU IS A PICTURE THAT DR. HAMMAR DREW -- TO EXPLAIN TO US HOW, BASICALLY, THE LUNGS WORK AND PARTICULARLY IN RELATION TO THE INHALATION OF

http://legacy.library.ucsf.edu/tid/gmo5a00/pdf Digitized by the Industry Documents Library at UCSF http://industrydocuments.ucsf.edu/docs/nfxd0001

ASBESTOS DUST.
YOU HAVE BROUGHT SOME SLIDES ALONG TO HELP ILLUSTRATE YOUR TESTIMONY; IS THAT CORRECT?
A. YES, I DID. I'M A LOUSY ARTIST; DR. HAMMAR IS A MUCH BETTER ARTIST THAN I AM.
Q. OKAY. IF YOU CAN COME DOWN HERE, I'LL PLUG IN THE MACHINE.
(PAUSE IN PROCEEDINGS.)
THE WITNESS: OKAY. IN ORDER TO UNDERSTAND WHAT'S WRONG WITH MR. WRIGHT, I THINK YOU NEED TO UNDERSTAND

SOMETHING ABOUT THE ANATOMY OF THE --
BY MR. HARLEY: Q. KEEP YOUR VOICE UP. THIS MACHINE ....
A. ALL RIGHT.
AND I'M GOING TO START FROM THE OUTSIDE AND WORK MY WAY IN. ON THE OUTSIDE IS THE SKIN. THAT'S NOT DEPICTED HERE. UNDER THE SKIN IS THE SUBCUTANEOUS TISSUE IN THE MUSCLE. THAT'S NOT DEPICTED HERE. AND UNDER THAT IS THE SKELETAL STRUCTURE OF THE CHEST AND THAT IS DEPICTED HERE.
HERE'S A PICTURE OF THE SKELETAL CHEST FROM THE FRONT AND THIS IS FROM THE BACK. IN THE FRONT, WE HAVE THE STERNUM OR WHAT YOU MIGHT CALL THE BREASTBONE, AND CONNECTED TO IT ARE RIBS. THE RIBS ARE IN THE SHAPE OF A "C." THERE ARE 12 RIBS ON EACH SIDE.
IN THE BACK IS THE SPINE AND THE RIBS CONNECTED TO THE SPINE. THIS PROVIDES A CYLINDRICAL STRUCTURE TO THE CHEST WHICH PROVIDES THE VOLUME TO THE CHEST.
IN ORDER TO HAVE NORMAL LUNG FUNCTION, IT'S CRITICAL THAT THE SKELETAL STRUCTURE OF THE CHEST BE NORMAL.
Q. SO BREATHING ACTUALLY CAN BE SAID TO INCORPORATE THE CHEST BONES, THE SKELETON?
A. THE SKELETON IS A KEY COMPONENT OF YOUR BREATHING.
HERE WE HAVE AN ARTIST DEPICTION OF THE RIBS IN BLACK. SO HERE'S THE FIRST RIB, SECOND RIB, THIRD RIB, FOURTH RIB, FIFTH RIB, SIXTH RIB, ET CETERA. THIS REPRESENTS THE RIGHT SIDE, THIS REPRESENTS THE LEFT SIDE. IT'S AS IF YOU ARE LOOKING AT ME.
THE PURPLISH STRUCTURE IN HERE IS THE LUNG. THIS

REPRESENTS THE RIGHT LUNG, THIS PURPLISH RIGHT HERE REPRESENTS THE LEFT LUNG, THE STRUCTURE SEEN IN SILHOUETTE HERE IS THE HEART. THE HEART IS ACTUALLY SURROUNDED A LITTLE BIT IN THE FRONT BY THE LUNG. THE HEART IS IN THE MIDDLE, TO THE LEFT SIDE OVER HERE.
NOW, THE ARTIST ALSO PUT SOMETHING ELSE IN HERE WHICH IS THE "BLUE STRUCTURE." THIS IS REALLY NOT BLUE, BUT THE ARTIST TOOK SOME LICENSE HERE.
THIS IS CALLED THE "PLEURA." THE PLEURA IS A VERY THIN MEMBRANE WHICH SURROUNDS THE LUNG. THERE'S A PLEURAL SURFACE AROUND THE RIGHT LUNG AND THERE'S A PLEURAL SURFACE AROUND THE LEFT LUNG. AND, ACTUALLY, THE PLEURA IS A FAIRLY COMPLICATED SURFACE.
AND I ASK THAT YOU THINK OF IT IN THE FOLLOWING WAY: PRETEND I HAVE A FLOPPY BEACH BALL IN MY HAND. ALL RIGHT. THERE'S ALMOST NO WEAR IN THE BEACH BALL AND I TAKE MY FIST AND JAM IT INTO THE BEACH BALL LIKE SO. IF YOU ARE SITTING HERE LOOKING AT THIS, IT LOOKS AS IF THE BEACH BALL HAS TWO SURFACES: IT HAS AN INNER SURFACE PLASTERED UP AGAINST MY FIST AND IT HAS AN OUTER SURFACE, BUT IN FACT THE BEACH BALL IS ONE CONTINUOUS SURFACE.
IF BLEW THE BEACH BALL UP, YOU WOULD SEE IT WAS ONE CONTINUOUS SURFACE. THE SAME THING IS TRUE FOR THE LUNG,

http://legacy.library.ucsf.edu/tid/gmo5a00/pdf Digitized by the Legacy Industry Documents Library - http://industrydocuments.ucsf.edu/docs/nfxd0001

THAT IS, THE PLEURA, THE LUNG IS LIKE MY FIST. AND THE FIST IS JAMMED RATHER THAN INTO THE BEACH BALL, INTO THE PLEURAL SURFACE. SO THERE'S A PORTION OF THE PLEURAL SURFACE THAT'S PLASTERED UP AGAINST THE LUNG.

IT THEN FOLDS AROUND ON ITSELF IN THE MIDDLE OF THE

CHEST JUST LIKE THE EDGE OF THE BEACH BALL DOES AND THERE'S AN OUTER PORTION OF THE PLEURAL SURFACE WHICH IS PLASTERED UP AGAINST THE INSIDE OF THE RIBS, AND THERE ARE ACTUALLY MUSCLES THAT GO BETWEEN THE RIBS. ALL RIGHT.

NOW, IF YOU ARE LOOKING AT THIS HERE, IT LOOKS AS IF YOU HAVE TWO DIFFERENT PLEURAL SURFACES. IF YOU WERE TO STICK A NEEDLE IN RIGHT NOW, YOU WOULD STICK IT THROUGH TWO PLEURAL SURFACES, THE PART THAT'S PLASTERED UP AGAINST THE INSIDE OF THE RIBS AND THE PART THAT'S SITTING ON THE LUNG. IN FACT, IT'S ONE CONTINUOUS SURFACE, BECAUSE IT FALLS AROUND ON ITSELF.

Q. DR. HORN, DOES IT COMPLETELY COVER ALL PORTIONS OF THE LUNG?

A. IT COMPLETELY COVERS ALL PORTIONS OF THE LUNG.

Q. OKAY.

A. NOW, THERE'S A POTENTIAL SPACE IN THERE JUST LIKE THE BEACH BALL. YOU CAN PUT AIR IN THE BEACH BALL, YOU CAN TAKE IT OUT. UNDER NORMAL CIRCUMSTANCES THERE'S ABOUT ONE TEASPOON OR 5 CC'S OF FLUID SITTING BETWEEN THESE TWO PLEURAL SURFACES, WHICH ARE REALLY ONE CONTINUOUS PLEURAL SURFACE.

BUT IN RESPONSE TO THE DISEASE, BECAUSE OF INFLAMMATION, INFECTION, TUMOR AND OTHER DISEASES, A LOT MORE CAN HAPPEN, THAT IS, FLUID CAN ACCUMULATE IN THIS POTENTIAL SPACE IN A MUCH LARGER VOLUME THAN JUST 5 CC'S.

Q. WHAT'S THE PURPOSE OF THE PLEURA?

A. WELL, I DIDN'T DESIGN IT, SO I CAN'T CLEARLY ANSWER IT. BUT IT'S A VERY GOOD SYSTEM, BECAUSE WHEN YOU BREATHE,

YOUR LUNGS EXPAND. WHEN THEY EXPAND, THEY WOULD MOVE ALONG AGAINST AN OUTER SURFACE AND YOU'D HAVE FRICTION. BY PROVIDING TWO SMOOTH SURFACES, IT ALLOWS THE LUNG TO SLIDE AGAINST ONE PLEURAL SURFACE, CAN SLIDE AGAINST THE OTHER, AND THE RESISTANCE TO BREATHING IS THEREBY REDUCED.

AT LEAST IF I WERE TO DESIGN A SYSTEM, THAT WOULD BE GOOD. IT'S SORT OF LIKE PUTTING OIL IN THE CAR SO THE PISTONS RUN SMOOTHLY.

THERE'S A PLEURAL SURFACE AROUND THE RIGHT LUNG, THERE'S A PLEURAL SURFACE AROUND THE LEFT LUNG, AND THERE'S ACTUALLY THE SAME SORT OF MEMBRANE AROUND THE HEART. OF COURSE, WE GIVE IT A DIFFERENT NAME TO MAKE IT COMPLICATED; IT'S CALLED THE PERICARDIUM.

THE LINING OF THE LUNG IS NOT THE SAME TISSUE AS THE LUNG. IT'S A COMPLETELY DIFFERENT TISSUE. IT'S SORT OF LIKE THE LUNG AND THE HEART ARE DIFFERENT TISSUES. THE PLEURAL SURFACE AROUND THE LUNG IS AN ENTIRELY DIFFERENT TISSUE THAN THE LUNG ITSELF.

THE DIAPHRAGM IS SITTING DOWN HERE AND IT SEPARATES THE CHEST FROM THE ABDOMEN. THIS PALE PINK STRUCTURE DOWN HERE REPRESENTS THE LIVER, THIS EVEN PALER STRUCTURE IS THE STOMACH, AND THIS GREY STRUCTURE IS A PORTION OF THE INTESTINE. IT IS NOT REALLY THAT COLOR.

NOW, THE NEXT SLIDE I HAVE THIS TO DEMONSTRATE WHAT IS THE NORMAL FLOW OF AIR. WHEN YOU BREATHE, WHERE DOES AIR GO? THIS IS A CROSS-SECTION OF THE HEAD AND THEN WE GET INTO THE CHEST.

WHEN YOU BREATHE, AIR COMES IN THROUGH THE NOSE OR

http://legacy.library.ucsf.edu/tid/gmo5a00/pdf Digitized by the Legacy Industry Documents Library - http://industrydocuments.ucsf.edu/docs/nfxd0001

THE MOUTH OR BOTH COMES DOWN THE BACK OF YOUR THROAT. THE BACK OF YOUR THROAT SPLITS INTO TWO TUBES: ONE IS YOUR AIRWAY WHICH GOES INTO YOUR LUNG, THE OTHER IS THE ESOPHAGUS.

AT THE UPPER END OF YOUR AIRWAY IS YOUR VOICE BOX OR YOUR LARYNX. THIS IS WHERE YOUR VOCAL CORDS ARE. HERE IS THE TRACHEA RIGHT HERE, THE TRACHEA SPLITS INTO AN AIRWAY WHICH GOES INTO THE RIGHT LUNG AND AN AIRWAY WHICH GOES INTO THE LEFT LUNG.

HERE IS THE TRACHEA DIVIDED OUT: THE TRACHEA IS ACTUALLY A FAIRLY RIGID STRUCTURE. IT'S RIGID BECAUSE IT HAS THESE RINGS IN IT. THE RINGS ARE MADE OF CARTILAGE. CARTILAGE IS THE STUFF THAT'S IN YOUR EARS THAT PROVIDES THE RIGIDITY OR THE END OF YOUR NOSE. SO THIS IS NOT A COLLAPSIBLE AIRWAY BECAUSE IT'S RIGID.

AS THE TRACHEA GOES DOWN IT DIVIDES IN AN AIRWAY AND THE RIGHT GOES INTO THE RIGHT LUNG, AND AN AIRWAY WHICH GOES INTO THE LEFT LUNG. THEN ON THIS SIDE, FOR INSTANCE, THIS DIVIDES INTO AN AIRWAY WHICH GOES INTO THE LEFT UPPER LOBE AND AN AIRWAY WHICH GOES INTO THE LEFT LOWER LOBE AND THEN THOSE AIRWAYS WAYS DIVIDE.

SO ONE DIVIDES INTO TWO, TWO INTO FOUR, FOUR INTO EIGHT, EIGHT INTO TO 16, ET CETERA. AND EACH TIME THE AIRWAYS DIVIDE, THEY GET SMALLER AND THIS CONTINUES IN THIS WAY, SO THAT THESE AIRWAYS GET GRADUALLY SMALLER, AND SMALLER, AND SMALLER, AND SMALLER, UNTIL YOU CAN ONLY SEE THEM UNDER A MICROSCOPE. THESE ARE VERY, VERY TINY LITTLE AIRWAYS.

Q. YOU WOULDN'T SEE THESE SMALL AIRWAYS WHEN YOU OPEN UP A LUNG IN SURGERY, FOR INSTANCE?

A. NO, YOU COULDN'T SEE THEM. THEY ARE WAY TOO SMALL. IT'S LIKE A TREE OUTSIDE WHICH STARTS WITH A LARGE TRUNK AND THEN DIVIDES INTO LARGE BRANCHES AND THEN SMALLER BRANCHES, AND EVEN MORE SMALLER BRANCHES UNTIL YOU WIND UP WITH MANY THOUSANDS OF TWIGS ON THE TREE.

A NORMAL LUNG CONTAINS 100,000 TERMINAL BRONCHIALS. NOW, THE TERMINAL BRONCHIALS END IN SOMETHING. WHAT THEY END WITH IS AIR SACS. THESE ARE TINY LITTLE BALLOON-LIKE STRUCTURES. THE NORMAL LUNG HAS 300 MILLION OF THESE.

NOW, LIFE GETS MORE COMPLICATED WITH ANOTHER TERMINAL BRONCHIAL COMING DOWN AND ENDING IN MANY AIR SACS. IN ADDITION, THERE ARE BLOOD VESSELS THAT FOLLOW THE SAME COURSE, AND THE BLOOD VESSELS DIVIDE INTO FIVE CAPILLARY NETWORKS WHICH SURROUND EACH AND EVERY ONE OF THESE AIR SACS.

A CAPILLARY IS A TINY LITTLE BLOOD VESSEL AND IN THESE BLOOD VESSELS ARE THE BLOOD, AND THIS IS THE KEY FUNCTION OF THE LUNG HERE WE'RE TALKING ABOUT.

NOW, THE LAST SLIDE IS A CROSS-SECTION OF ONE OF THESE AIR SACS.

Q. WE JUST SAW A BUNCH OF -- I ALWAYS CALL THEM GRAPE-LIKE STRUCTURES -- BUT LITTLE AIR SACS?

A. RIGHT.

Q. AND THIS PICTURE IS ONE?

A. ONE OF THEM.

Q. ONE OF THEM?

A. BUT YOU HAVE CUT RIGHT THROUGH IT. THIS IS HAVING CUT THROUGH ONE OF THESE AIR SACS AND THE YELLOW REPRESENTS THE WALL OF THE AIR SACK. THIS IN FACT IS EXTREMELY SMALL THAT YOU SEE UNDER HIGH POWER ON A MICROSCOPE.

http://legacy.library.ucsf.edu/tid/gmo5a00/pdf Digitized by the Legacy Industry Documents Library - http://industrydocuments.ucsf.edu/docs/nfxd0001

NOW, THE AIR SAC IS SURROUNDED BY BLOOD VESSELS. HERE'S ONE BLOOD VESSEL, HERE'S ANOTHER BLOOD VESSEL, HERE'S ANOTHER BLOOD VESSEL. THE DISTANCE ACROSS HERE IS EXTREMELY SMALL AND DOES NOT, IN ANY WAY, INTERFERE WITH THE ABILITY OF GASSES TO GO FROM THE AIR SAC INTO THE CAPILLARY.

SO WHEN YOU BREATHE, YOU BREATHE AIR INTO YOUR LUNG, AND THE AIR THAT YOU BREATHE IN YOUR LUNG CONTAINS 21 PERCENT OXYGEN. SO WHAT'S SITTING IN THIS AIR SAC CONTAINS 21 PERCENT OXYGEN. THE OXYGEN CAN EASILY TRAVERSE ACROSS THIS MEMBRANE INTO THE CAPILLARY. SITTING IN THE CAPILLARY ARE RED BLOOD CELLS, THAT'S YOUR BLOOD, AND IN THE RED BLOOD CELLS IS A PROTEIN CALLED HEMOGLOBIN. HEMOGLOBIN AVIDLY BINDS OXYGEN.

SO WHAT HAPPENS IS THE OXYGEN GOES ACROSS THIS MEMBRANE INTO THE CAPILLARY AND IS PICKED UP BY THE HEMOGLOBIN. YOUR HEART PUMPS. AS YOUR HEART PUMPS, THE BLOOD WHICH CONTAINS OXYGEN GETS TRANSPORTED ALL ACROSS YOUR BODY, EVERYWHERE IN YOUR BODY. AND IN YOUR BODY THE -- THROUGH A PROCESS YOU DON'T REALLY WANT TO KNOW ABOUT BECAUSE WE'LL BE HERE ALL DAY -- THE OXYGEN IS RELEASED FROM THE HEMOGLOBIN AND GOES INTO THE TISSUE.

IN ORDER FOR YOU TO LIVE, BASICALLY EVERY CELL OF YOUR BODY HAS TO BE PROVIDED WITH OXYGEN ALL THE TIME, BECAUSE OF THE CELLS OF YOUR BODY USE OXYGEN WITH SUGAR OR

THE TECHNICAL TERM IS GLUCOSE, A METABOLIC PROCESS OCCURS IN EVERY ONE OF THESE, AS WELL AS A REAP ACTION OCCURS IN EACH ONE OF THESE CELLS TO PRODUCE ENERGY. EVERY CELL OF YOUR BODY HAS TO PRODUCE ENERGY ALL OF THE TIME, AND THE KEY INGREDIENT TO DO THAT IS "OXYGEN." SO THE OXYGEN HAS TO BE PROVIDED TO TISSUE ALL THE TIME.

AS A BY-PRODUCT OF THAT PROCESS OF METABOLIZING OXYGEN AND SUGAR, YOU GET CARBON DIOXIDE. THE CARBON DIOXIDE GOES BACK INTO THE BLOOD IN THE TISSUE, IT GETS PUMPED BACK TO THE LUNG, THE CARBON DIOXIDE GOES FROM THE CAPILLARY INTO THE AIR SAC, AND YOU BREATHE IT BACK INTO THE ROOM.

THAT PROCESS IS CALLED, THAT ENTIRE PROCESS OF TAKING IN OXYGEN, METABOLIZING IT, GETTING THE CARBON DIOXIDE BACK TO THE LUNG AND GETTING RID OF IT IS CALLED RESPIRATION. IT'S CRITICAL TO YOUR SURVIVAL, IT GOES ON ALL THE TIME.

IN ORDER FOR IT TO WORK, ALL PARTS OF THE SYSTEM HAVE TO WORK PROPERLY: THE LUNG HAS TO WORK PROPERLY, YOU HAVE TO HAVE BLOOD VESSELS IN THE LUNG, YOU HAVE TO HAVE BLOOD IN THE BLOOD VESSELS, YOU HAVE TO HAVE AN ADEQUATELY FUNCTIONING HEART TO DELIVER BLOOD TO THE TISSUE WHERE THE OXYGEN IS METABOLIZED, AND YOU HAVE TO GET RID OF THE CARBON DIOXIDE AGAIN BACK IN THE LUNG.

Q. NOW, AGAIN, DR. HORN, CAN YOU EXPLAIN TO US HOW THE BODY GETS ASBESTOS IN IT AND HOW THE LUNG REACTS TO IT?

A. OKAY. IF YOU ARE IN AN ENVIRONMENT WHERE FREE ASBESTOS FIBERS ARE PRESENT IN THE AIR, YOU STILL HAVE TO

BREATHE, YOU HAVE TO BREATHE TO LIVE.

ASBESTOS FIBERS WILL FOLLOW THE SAME COURSE AS THE AIR THAT YOU ARE BREATHING IN. IT WILL COME IN THROUGH YOUR NOSE, IN YOUR MOUTH TO THE BACK OF YOUR THROAT, DOWN THE AIRWAY WHICH GOES INTO YOUR LUNG --

Q. NOW, WILL --

A. -- AND WILL FOLLOW ALONG THE TRACHEA.

Q. WILL ALL OF THEM GO THAT FAR?

A. NOT ALL OF THEM WILL GO THAT FAR.

http://legacy.library.ucsf.edu/tid/gmo5a00/pdf Stanford Libraries industrydocuments.ucsf.edu/docs/nfxd0001

Q. HOW COME?
A. WELL, IF YOU ARE DEALING WITH FAIRLY LARGE PARTICULATE MATTER, IT GETS DEPOSITED IN THE NOSE. THE MUCOSAL SURFACE AND THE HAIR PRESENT IN THE NOSE WILL TRAP SOME OF THE LARGER PARTICULATE MATTER THAT YOU INHALE; BUT IF IT'S SMALL, IT WILL BYPASS THIS MECHANISM.
Q. ARE THERE OTHER DEFENSES?
A. YES.
IN THE LARGER AIRWAYS WHICH ARE PRESENT IN THE LUNG, INCLUDING THE TRACHEA AND THE LARGER BRONCHI, THERE IS SOMETHING CALLED THE "MUCOCILIARY MECHANISM."
THERE IS AN INNER LINING TO THESE TUBES, THEY ARE LINED WITH CELLS, ALL RIGHT, AND THESE CELLS HAVE FINE HAIR LIKE STRUCTURES THAT COME OFF THE INSIDE THAT LINE THE INSIDE OF THIS AIRWAY. THESE FINE AIR-LIKE STRUCTURES ARE CALLED "CILIA," C-I-L-I-A. IN ADDITION, THERE ARE MUCUS SELLS PRESENT IN THE AIRWAYS AND WHICH ARE CONTINUOUSLY PRODUCING MUCUS WHICH FLOATS ON TOP OF THE CILIA HERE.
ALL RIGHT. NOW, SOME OF THE FOREIGN MATERIAL THAT

YOU INHALE WILL GET TRAPPED IN THE MUCUS THAT YOU INHALED. AGAIN, SOME OF THE LARGER MATERIAL GETS TRAPPED, THE SMALLER MATERIAL WILL STAY IN THE AIR; BUT THE LARGER STUFF WILL TEND TO FLOAT TOWARD THE OUTSIDE AND GET TRAPPED IN THE MUCUS.
THESE CILIA ARE REALLY QUITE INTERESTING BECAUSE THEY MOVE. THEY HAVE A RAPID UPWARD PHASE AND A SLOW DOWNWARD PHASE. AND THE NET EFFECT IS TO PROPEL THE MUCUS UP AGAINST GRAVITY AND IT WILL GRADUALLY PROPEL THE MUCUS UP UNTIL IT COMES IN THE BACK OF THE THROAT AND THEN YOU'LL SWALLOW IT.
AND ONE MECHANISM, A MECHANISM OF CLEARING MATERIAL THAT YOU INHALE IS, IT GETS TRAPPED IN THIS MUCUS BLANKET WHICH GRADUALLY GETS MOVED UP AND YOU SWALLOW IT AND YOU ELIMINATE FOREIGN MATERIAL THAT YOU INHALE IN YOUR LUNG.
Q. NOW, DR. HORN, ARE THESE CILIA SENSITIVE TO OUTSIDE SUBSTANCES THEMSELVES?
A. YES.
Q. CAN THEY BE STOPPED IN THEIR FUNCTION?
A. YES.
Q. WHAT ARE SOME OF THE COMMON SUBSTANCES THAT DO THAT?
A. UNEQUIVOCALLY, THE MOST COMMON THING THAT DOES THIS IS SMOKING CIGARETTES. THERE IS SOMETHING IN CIGARETTE SMOKE THAT PARALYZES THE CILIARY MECHANISM. SO IT JUST STOPS AND YOU DON'T CLEAR THE MUCUS. ALCOHOL, ALSO, HAS AN IMPACT ON THE CILIARY MECHANISM.
Q. ALL RIGHT.
IS IT KIND OF SHORT-TERM OR IS IT A LONG-TERM?

A. IT'S LONG-TERM. IT'S BOTH LONG-TERM AND SHORT-TERM.
Q. WHAT DO YOU MEAN BY THAT?
A. IF YOU SMOKE, IT'S SHORT-TERM; BUT IT'S ALSO LONG-TERM, BECAUSE IF YOU SMOKE, YOU CAN CAUSE ALTERATIONS IN THE NORMAL ANATOMY OF THE INNER LINING OF THE AIRWAY AND YOU LOSE THE CELLS THAT HAVE THE CILIA ON THEM.
Q. AND IT TAKES AWHILE TO REPLACE THEM AFTER YOU QUIT?
A. YES.
Q. DOES ASBESTOS GET ALL THE WAY DOWN INTO THE AIR SACS?
A. YES. IF THE ASBESTOS IS SMALL ENOUGH, IT WILL TRAVERSE AND DEPOSIT IN THE TERMINAL BRONCHIALS AND IN THE AIR SACS.
Q. AND WE KNOW THIS THROUGH WHAT KIND OF STUDIES?

http://legacy.library.ucsf.edu/tid/gmo5a00/pdf Digitized by the Legacy Industry Documents Library - http://industrydocuments.ucsf.edu/docs/nfxd0001

A. STUDIES IN ANIMALS AND HUMANS. YOU CAN FIND ASBESTOS FIBERS PRESENT IN HUMANS IN THE LUNGS.
Q. AND DOES IT CAUSE ANY PROBLEMS IN THE LUNG ITSELF?
A. YES.
Q. WHAT DOES IT DO?
A. ASBESTOS IS A FOREIGN MATERIAL. IT IS PERCEIVED BY THE BODY AS A FOREIGN MATERIAL. THE BODY HAS THE ABILITY TO DEFINE WHAT IS YOU AND WHAT ISN'T YOU.

SO THIS LITTLE BROWN THING SITTING OVER HERE, WHICH I DIDN'T MENTION BEFORE, IS AN ALVEOLAR MACROPHAGE. IT'S A KIND OF WHITE BLOOD CELL WHICH IS PRESENT IN THE LUNG. FOR REASONS WE DON'T UNDERSTAND, THIS CELL KNOWS WHAT'S YOU AND WHAT'S NOT YOU.

SO IF YOU INHALE FOREIGN MATERIAL IN THE LUNG,

SOMEHOW THIS CELL RECOGNIZES THAT'S FOREIGN MATERIAL AND ATTEMPTS TO ENGULF IT AND DESTROY IT. THERE ARE ENZYMES PRESENT IN THE MACROPHAGES WHICH DESTROY SOME MATERIAL, AT LEAST BIOLOGIC MATERIALS, PERNICIOUS (SIC) MATERIALS.

SO THE MACROPHAGE WILL COME ALONG AND TRY TO GOBBLE UP AN ASBESTOS FIBER WHICH IS DEPOSITED EITHER IN THE AIR SAC OR IN THE TERMINAL BRONCHIALS.

Q. AND IS IT SUCCESSFUL?
A. SOMETIMES, BUT OFTEN NOT.
Q. AND WHAT HAPPENS WHEN IT'S NOT?
A. WELL, FOR REASONS WHICH ARE NOT CLEAR, THIS INERT MATERIAL -- ASBESTOS IS INERT MATERIAL -- CAN DESTROY THE MACROPHAGE AND THE CONTENTS OF THE MACROPHAGE GET RELEASED IN THE LUNG.

WHEN THE CONTENTS OF THE MACROPHAGE ARE IN THE MACROPHAGE THAT'S GOOD. WHEN THE CONTENTS OF THE MACROPHAGE ARE PRESENT IN THE LUNG THAT'S NO GOOD, BECAUSE THAT STIMULATES AN INFLAMMATORY PROCESS IN THE LUNG AND OTHER CELLS MOVE IN THE LUNG, AND GRADUALLY OVER TIME SCAR TISSUE STARTS GETTING DEPOSITED IN THE LUNG.

Q. AND THE SCAR TISSUE CREATES AN IMPEDIMENT TO BREATHING?
A. RIGHT. IN ORDER FOR THE LUNG TO WORK PROPERLY, YOU WOULD HAVE TO HAVE A NORMAL ANATOMICAL STRUCTURE IN THE LUNG, THAT IS, THE DISTANCE FROM THE AIR SAC TO THE CAPILLARY HAS TO BE THIS KIND OF DISTANCE, VERY NARROW.

IF YOU BEGIN ALTERING THE ANATOMY IN THE LUNG PLUS YOU START LAYING SCAR TISSUE DOWN, THEN YOU WILL START

INTERFERING WITH GAS EXCHANGE AND THE EFFICIENCY OF LUNG FUNCTION WILL PROGRESSIVELY GET WORSE AS THE AMOUNT OF SCAR TISSUE THAT IS LAID DOWN INCREASES.

Q. IS THERE A NAME FOR THE DISEASE OF SCARRING CAUSED BY ASBESTOS?
A. YES.
Q. WHAT'S THAT?
A. ASBESTOSIS.
Q. AND IS THAT VERY SIMPLY HOW ASBESTOSIS OCCURS?
A. IN ITS SIMPLEST FORM, YES.
Q. AND HOW LONG DOES THIS PROCESS TAKE?
A. WELL, IT STARTS VERY QUICKLY AFTER YOU HAVE INHALED ASBESTOS; BUT IN ORDER FOR ME, AS A CLINICAL PULMONARY SPECIALIST, TO DIAGNOSE SOMEBODY AS HAVING ASBESTOSIS IT TYPICALLY TAKES DECADES THAT DIAGNOSIS IS MADE DECADES AFTER THE ONSET OF EXPOSURE TO ASBESTOS.
Q. THERE'S ALSO SOMETHING CALLED "PLEURAL PLAQUES"?
A. YES.
Q. CAN YOU SHOW US WHAT THOSE ARE OR TELL US BRIEFLY

http://legacy.library.ucsf.edu/tid/gmo5a00/pdf Digitized by the Legacy Industry Documents Library - http://industrydocuments.ucsf.edu/docs/nfxd0001

HOW THEY ARE CAUSED?
A. PLAQUES ARE LOCALIZED ACCUMULATIONS OF SCAR TISSUE WHICH OCCUR ON THE PLEURAL SURFACE.
Q. AND CAN THEY BE CAUSED BY ASBESTOS?
A. THEY ARE DEFINITELY CAUSED BY ASBESTOS.
Q. IS THAT THE MOST FREQUENT CAUSE?
A. THERE ARE CERTAIN CLASSIC AND CHARACTERISTIC APPEARANCES OF THE PLEURAL PLAQUES. NOTHING ELSE CAUSES IT BUT ASBESTOS.

Q. AND WHERE DO THEY PREDOMINANTLY OCCUR?
A. THEY TEND TO OCCUR MORE IN THE LOWER LUNG FIELDS RATHER THAN IN THE UPPER LUNG FIELDS, ALTHOUGH THEY CAN OCCUR ANYWHERE. THEY TEND TO BE "POSTERIORLY" RATHER THAN "ANTERIORLY."
Q. YOU MEAN IN THE "BACK" RATHER THAN IN THE "FRONT"?
A. RIGHT, ALTHOUGH THERE ARE EXCEPTIONS TO THE RULE PARTICULARLY WITH REGARD TO PLEURAL PLAQUES.
Q. AND WE HAVE HAD HEARD SOME TALK ABOUT "CALCIFIED PLEURAL PLAQUES."
WHAT'S THAT?
A. WHEN PLAQUES ARE THERE FOR A PROLONGED PERIOD OF TIME, NOW WE'RE TALKING ABOUT DECADES, THE BODY STARTS DEPOSITING CALCIUM INTO THE SCAR TISSUE. "CALCIUM" IS WHAT GIVES BONE ITS DENSITY.
SO THE PLAQUES BECOME MUCH MORE DENSE AND THEY ARE MUCH MORE EASILY SEEN BY X-RAY, BECAUSE THEY ARE MUCH MORE DENSE.
Q. AND "DIAPHRAGMATIC PLAQUES," WHAT DOES THAT MEAN?
A. PLAQUES ALONG THE DIAPHRAGMATIC PLEURAL SURFACE --
Q. THEY ARE --
A. -- WHICH IS DOWN HERE.
Q. THEY ARE STILL ON THE PLEURA?
A. THEY ARE STILL ON THE PLEURA.
Q. AND THE PROCESS, HOW DOES THE ASBESTOS GET OUT TO THE PLEURA AND CAUSE SCARRING?
A. WELL, I CAN ONLY ANSWER PART OF THAT QUESTION. ASBESTOS DEFINITELY GETS OUT TO THE PLEURA BY SEVERAL

MECHANISMS; THERE ARE AIR SACS RIGHT AT THE EDGE OF THE LUNG WHERE THE PLEURA IS. SO SOME OF THE ASBESTOS THAT YOU INHALE WILL GET TO THE AIR SACS, WHICH ARE AT THE EDGE OF THE LUNG.
SECONDLY, THE ASBESTOS FIBERS ARE PICKED UP BY MACROPHAGES AND MACROPHAGES MOVE THROUGH THE LUNG AND WHO IS TO SAY WHICH DIRECTION THE MACROPHAGES ARE GOING TO MOVE. THEY CAN MOVE OUT.
THIRDLY, THERE'S ANOTHER SET OF TUBES PRESENT IN THE LUNG CALLED "LYMPHATICS." THERE ARE LYMPHATICS ALL OVER YOUR BODY WHICH DRAIN FLUID, THERE ARE LYMPHATICS IN THE LUNG, AND IT HAS BEEN DEMONSTRATED THAT ASBESTOS FIBERS CAN GET INTO LYMPHATICS AND MOVE TO THE PLEURAL SURFACE.
THERE ARE ALSO PORES BETWEEN AIR SACS, THERE ARE HOLES BETWEEN THESE AIR SACS. THESE ARE NOT ABSOLUTELY INTACT BALLOONS AND MATERIAL CAN MOVE FROM AIR SAC TO AIR SAC.
Q. THE ASBESTOS FIBERS ARE SMALL ENOUGH TO GO THROUGH THE AIR SAC?
A. YES. AND THEY CAN ACTUALLY, LITERALLY, THEY CAN PENETRATE AND GO THROUGH THE AIR SAC.
Q. SO ONCE IT REACHES AN AIR SAC, IT DOESN'T MEAN THE ASBESTOS FIBER STAYS IN THAT AIR SAC?
A. THAT'S CORRECT.

http://legacy.library.ucsf.edu/tid/gmo5a00/pdf Digitized by the Legacy Industry Documents Library - http://industrydocuments.ucsf.edu/docs/nfxd0001

Q. CAN JUST YOUR BREATHING MOVE THE ASBESTOS AROUND?
A. I DON'T KNOW.
Q. DOES IT?
A. MAYBE.

Q. "MAYBE." OKAY. THANK YOU, DOCTOR.
DR. HORN, YOU TALKED ABOUT ASBESTOSIS AND ASBESTOS-RELATED PLEURAL DISEASE.
ASBESTOS CAN ALSO CAUSE CANCER; IS THAT CORRECT?
A. YES.
Q. AND WITHIN OF THOSE FORMS OF CANCER IS MESOTHELIOMA?
A. YES.
Q. BRIEFLY, WHAT IS "MESOTHELIOMA"?
I THINK THE JURY HAS HEARD SOME OF THIS.
A. "MESOTHELIOMA" IS A CANCER WHICH ARISES FROM THE LINING OF THE LUNG, THE MESOTHELIAL CELLS. THAT'S COMPLETELY SEPARATE FROM THE LUNG, IT'S A DIFFERENT TISSUE FROM THE LUNG, AND IT'S A COMPLETELY DIFFERENT CANCER THAN THOSE THAT ARISE FROM THE LUNG.
Q. DOES ASBESTOS CAUSE MESOTHELIOMA?
A. ASBESTOS IS THE ONLY KNOWN CAUSE OF MESOTHELIOMA IN MAN, WITH ONE MINOR EXCEPTION.
Q. AND WHAT'S THE MINOR EXCEPTION?
A. THERE IS AN ASBESTOS FORM LIKE MATERIAL PRESENT IN TURKEY, WHICH HAS BEEN USED AS A BUILDING MATERIAL CALLED "ZEOLITE," AND EXPOSURE TO ZEOLITE -- WHICH IT REALLY IS AN ASBESTOS FORM OF MINERAL -- IS ALSO KNOWN TO CAUSE MESOTHELIOMA.
Q. ZEOLITE SOMETIMES CALLED "ERIONITE"?
A. YES.
Q. DOES CIGARETTE SMOKING CAUSE MESOTHELIOMA?
A. DEFINITELY NOT.
Q. IS IT ASSOCIATED -- ARE CIGARETTE SMOKERS MORE

LIKELY TO GET MESOTHELIOMA?
A. NO.
Q. I HAVE ASKED YOU TO REVIEW CERTAIN MATERIALS RELATED TO MR. WINZO (SIC) -- WRIGHT?
A. MR. WRIGHT.
Q. MR. WRIGHT.
AND YOU HAVE DONE THAT?
A. YES.
Q. WHAT ARE THEY?
A. WELL, I REVIEWED HIS MEDICAL RECORDS, WHICH WERE QUITE EXTENSIVE, AND I HAVE REVIEWED HIS X-RAYS.
Q. BASED UPON THE REVIEW OF THE MEDICAL RECORDS AND THE REVIEW OF HIS X-RAY FILMS, DID YOU REACH ANY OPINION AS TO WHETHER HE SUFFERS FROM ANY ASBESTOS-RELATED DISEASE?
A. YES.
Q. WHAT ARE THOSE CONCLUSIONS?
A. WELL, HE HAS AT LEAST TWO: HE HAS MALIGNANT MESOTHELIOMA CAUSED BY PRIOR ASBESTOS EXPOSURE, HE HAS PLEURAL PLAQUES UNQUESTIONABLY CAUSED BY PRIOR ASBESTOS EXPOSURE, AND HE "MIGHT" OR "MIGHT NOT" HAVE ASBESTOSIS.
Q. WHY ARE YOU UNCERTAIN AS TO WHETHER HE HAS ASBESTOSIS?
A. WELL, I DON'T HAVE ENOUGH INFORMATION TO KNOW. I ONLY SAW COPIES OF HIS X-RAYS AND COPIES OF -- NOT AS GOOD AS THE ORIGINALS UNDER ANY CIRCUMSTANCES -- AND THESE ARE NOT THE GREATEST COPIES.
AND IN LOOKING AT THE COPIES, I'M UNABLE TO DETERMINE WHETHER HE REALLY HAS INCREASED MARKINGS IN HIS

http://legacy.library.ucsf.edu/tid/gmo5a00/pdf Digitized by the Legacy Industry Documents Library. http://www.industrydocuments.ucsf.edu/docs/nfxd0001

LUNG OR NOT. HE MIGHT OR HE MIGHT NOT. I CAN'T SAY HE DOES AND I CAN'T SAY HE DOESN'T.

THERE ARE A NUMBER OF PHYSICAL EXAMINATIONS DONE BY PHYSICIANS INCLUDING PULMONARY SPECIALISTS WHO DESCRIBE WHAT ARE CALLED "RALES." THOSE ARE CELLOPHANE CRACKLING LIKE SOUNDS FROM THE LUNG THAT IS HEARD IN INDIVIDUALS WHO HAVE ASBESTOSIS.

I HAVE ACTUALLY NO EXPLANATION FOR THE RALES. I DON'T SEE ANY OTHER DISEASE PRESENT THAT CAN ACCOUNT FOR THE RALES, SUGGESTING THAT HE MIGHT HAVE ASBESTOSIS.

Q. IN ADDITION, SOMETIMES IN DIAGNOSING ASBESTOSIS IT'S HELPFUL TO HAVE BREATHING TESTS?

A. YES.

Q. BUT ARE BREATHING TESTS COMPROMISED IF A PERSON HAS MESOTHELIOMA AND PLEURAL EFFUSIONS?

A. YES.

Q. HAS MR. WRIGHT HAD PLEURAL EFFUSIONS?

A. YES, HE'S HAD VERY LARGE PLEURAL EFFUSIONS. SO DURING THE TIME HE'S HAD THIS CLINICAL MALIGNANCY, LUNG FUNCTION TESTS WOULDN'T BE HELPFUL IN DETERMINING WHETHER THERE'S EVIDENCE OF ASBESTOSIS.

Q. OKAY.

IF HIS TREATING PHYSICIAN HAS DIAGNOSED HIM WITH ASBESTOSIS, DO YOU HAVE ANY DISAGREEMENT WITH THAT, BASICALLY?

A. NO. I CAN'T SAY THAT HE DOES NOT HAVE ASBESTOSIS, I'M NOT SURE WHETHER HE DOES OR NOT. I CERTAINLY CONSIDER THAT THE TREATING PHYSICIAN THINKS HE HAS ASBESTOSIS,

ALTHOUGH I WOULD LIKE TO KNOW WHAT THE BASIS OF THAT CONCLUSION IS.

Q. AND ASSUMING HE HAS ASBESTOSIS, WHAT WOULD BE THE CAUSE OF THE ASBESTOS PLEURAL DISEASE, THE MESOTHELIOMA, AND THE POSSIBLE ASBESTOSIS?

A. HIS ASBESTOS-RELATED DISEASES ARE CAUSED BY THE CUMULATIVE EFFECTS OF ALL OF THE ASBESTOS THAT HE HAS INHALED AND RETAINED IN HIS LUNG.

Q. DR. HORN, WHEN YOU SAY THE "CUMULATIVE EFFECTS OF THE ASBESTOS," IS THERE ANY WAY TO EXCLUDE PORTIONS OF HIS EXPOSURE?

A. THAT ASBESTOS THAT HE'S BREATHED, THERE'S NO POSSIBLE WAY TO EXCLUDE ANY EXPOSURE.

Q. WHY DO I SAY THAT?

A. THIS IS A DOSE-DEPENDENT DISEASE. ALL OF THESE ARE DOSE-DEPENDENT DISEASES. EVERY DISEASE THAT HE HAS ARE DOSE-DEPENDENT DISEASES, THAT IS, THE MORE ASBESTOS YOU INHALE AND RETAIN IN YOUR LUNG, THE MORE LIKELY YOU DEVELOP DISEASE.

THAT MEANS THAT ADDITIONAL ASBESTOS EXPOSURES DO THINGS IN THE LUNG AND THE PLEURAL SURFACE. ADDITIONAL EXPOSURES THAT INDIVIDUALS HAVE, HAVE IMPACT ON THEM, THAT IS, THEY ARE MORE LIKELY TO DEVELOP THE DISEASE AND THE DISEASES THAT THEY HAVE AREA WORSE BECAUSE OF ADDITIONAL EXPOSURES.

Q. AND WHEN YOU ARE TALKING ABOUT AN INDIVIDUAL LIKE MR. WRIGHT, CAN YOU TAKE OUT A YEAR'S EXPOSURE OR SIX MONTHS' EXPOSURE SOMEWHERE ALONG THE LINE AND SAY, "WELL, HE

WOULD HAVE GOTTEN IT ANYWAY"?

A. YOU HAVE ONLY TAKEN OUT ONE PERCENT OR A SMALL FRACTION OF HIS EXPOSURE. THERE WOULD BE NO SCIENTIFIC WAY TO DO THAT. IF YOU REMOVE ANY OF HIS EXPOSURE, YOU HAVE REDUCED HIS ASBESTOS BURDEN AND YOU NO LONGER HAVE

http://legacy.library.ucsf.edu/tid/gmo5a00/pdf Digitized by the Legacy Industry Documents Library - http://industrydocuments.ucsf.edu/docs/nfxd0001

MR. WRIGHT, YOU HAVE SOMEBODY ELSE WITH THAT ASBESTOS BURDEN WHO WOULD BE AT RISK FOR ASBESTOS-RELATED DISEASE; BUT YOU DON'T KNOW WHETHER THEY WOULD HAVE DEVELOPED IT OR NOT.

THE COURT: AT THIS POINT, WE'RE GOING TO TAKE OUR 10:00 O'CLOCK BREAK. FIFTEEN MINUTES, LADIES AND GENTLEMEN.

(RECESS.)

///

///

///

///

///

///

///

///

///

///

///

///

///

///

///

///

REPORTER'S CERTIFICATE

STATE OF CALIFORNIA)
) SS.
CITY AND COUNTY OF SAN FRANCISCO)

I, ERIC L. THRONE, A PRO TEMPORE COURT REPORTER OF THE SUPERIOR COURT OF THE CITY AND COUNTY OF SAN FRANCISCO, STATE OF CALIFORNIA, DO HEREBY CERTIFY THAT THE FOREGOING IS A FULL, TRUE AND CORRECT STATEMENT OF THE TESTIMONY AND PROCEEDINGS HAD IN THE WITHIN-ENTITLED MATTER, AND THAT THE SAME IS A FULL, TRUE AND CORRECT PARTIAL DAILY TRANSCRIPTION OF THE SHORTHAND NOTES AS TAKEN BY ME IN SAID MATTER.

DATED AT SAN FRANCISCO, CALIFORNIA, THIS 3RD DAY OF AUGUST 1995.

_____
ERIC L. THRONE, CSR NO. 7855

---O0O---

http://legacy.library.ucsf.edu/tid/gmo5a00/pdf
Digitized by the Tobacco Industry Documents Library at UCSF http://www.industrydocuments.ucsf.edu/docs/nfxd0001